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ABSTRACT

Research indicates that the role of information can be ambiguous in the decision-making process. Because relevance can be a problem with respect to information used in decision making, organizations should strive to achieve a linkage between flows of information and the making of specific decisions. Information flow between organizations and their environment also implicates the issue of adaptation to that environment. When organizations fail to adapt to changes, the changes threaten the efficiency of the organization by serving as obstacles to the achievement of goals. Scanning, a new system of information gathering, can improve decision making by systematically collecting information through literature reviews, interviews, and other means. Guidelines for information to be sought are developed by top management within the organization. Uncertainty and risk can be reduced, as scanning yields information relevant to the problems that are being addressed. Sears Roebuck, for example, has incorporated a scanning unit into its organization which follows a continuous model and monitors eight aspects of the environment to get information to make effective decisions. The unit is composed of two members who scan some 100 publications such as trade magazines and business journals. Unit staff members also conduct interviews to supplement information from publications. A senior management committee then determines whether the unit has fulfilled information needs. (A bibliography contains 27 references.) (SG)

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Evaluating the Usefulness of Scanning Systems as
Information Sources in the Decision-Making process

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More and more research in decision theory is examining the role of information in the decision making process. In exploring the dynamics of the use of information, theorists have agreed that the use of information is not optimized in the decision making process. In fact, the literature indicates that the role of information often can be ambiguous. March (1938), for instance, is a strong advocate of the argument that there exists ambiguities between information gathering and decision making. Specifically, the theorist contends that the primary problem of the use of information in organizations has to do with the question of relevance. Problems or actions are not understood to an extent to which they can be linked to the kind of information that can be of consequence (March, 1988). Instead, March (1988) contends that the pattern in most organizations includes the development of "information strategies that are relatively independent of specific anticipated demands" (1988, p. 390). March suggests as other theorists have done (March & Simon, 1958; Simon, 1955), that decision makers collect data as a part of a custom or as a routine in the work place with little regard for its relevance to the problem at hand. The act of data collection essentially becomes part of the rationalizing process of the decision maker (March & Simon, 1958).

In an effort to reduce the ambiguity between information of an organization, March and Sevon (1988) have proposed the incorporation of a strategy to optimize the information. The theorists suggest that decision makers should strive to achieve "a tight linkage" between flows of specific information and the making of specific decisions (March and Sevon, p. 434).

Furthering this "tight linkage" notion, Byrnes and Chesterton (1973) have suggested that a way to collect relevant information is to establish a

system of data collection. A clearly directed system would ensure the linkage by correlating the deliberation over issues, opportunities and problems facing the organization (Byrnes and Chesterton, 1973). As a central point, the system becomes an effective method to keep abreast of facts to make informed decisions (Byrnes and Chesterton, 1973).

None of the source of information found in the literature meet the description that calls for a systematic collection of information. As is discussed in the literature review of this proposal, most methods of information gathering are problematic because of a lack of tight linkage. Furthermore, the sources of information in the gathering process are usually one dimensional rather than the multi-faceted source described in the system proposed by Byrnes and Chesterton (1973).

However, there may be information sources for better decision making in organizations that the literature has not yet observed. For example, the nature and operations of the relatively new system known as scanning may be an information source and one that offers the tight linkage proposed in the literature. Briefly, scanning units systematically collect information for members in the organization through various means such as literature reviews and interviews. The focus of the research is on issues that have or will have a direct or indirect impact on the operations and/or success of the organization.

LITERATURE REVIEW

Information Needs

There are no standard set of information needs that can be attributed to all decision makers. However, it is apparent that the use of different information sources among groups of decision makers with

varying positions and responsibilities implies that there are different information needs among the groups. In fact, decision makers that are grouped together in terms of their positions in an organization, or in terms of what their tasks are have similar information needs (Shahla, 1982). For example, it is conceivable that an accountant is more than likely to have information needs that are similar to those of other accountants (and use similar sources of information), than he or she will have with a group of lawyers. Similarly, a lawyer is more likely to need types of information that are similar to the needs of other lawyers, than he or she has with medical doctors. The instance can go on ad infinitum.

For decision makers in the organization, for example, Goldhaber (1978) has identified certain information needs. Specifically, it is proposed the decision maker needs factual information, judgemental information and policy information so that the decision maker can solve problems and keep operations running effectively and efficiently (Goldhaber, 1978). Factual information is described as information that provides a demographic analysis of the organization and its operations. Thus, the information outlines the goals of the organization, employees, strengths, weaknesses, structure and operations (Goldhaber, 1978). Judgemental information, on the other hand, begins to analyze the facts about the organization to determine the effectiveness of its various functions and achievements of its aims (Goldhaber, 1978). Finally, policy information sets the parameters of the operations of the organization and subsequently, the options available to the decision makers in the completion of their assigned tasks and in the fulfillment of their responsibilities.

Similarly, it can be suggested that decision makers need information

that will help them make better choices from the alternatives available to them in a situation or problem. In short, decision makers need information that will help them do their jobs or, as Engstrom (1988) contends, the information has to be meaningful to their work.

This notion of "information meaningfulness" is a theme in decision theory that is also related to the notion of information value and the role of information in making informed choices. It is only through the attainment of meaningful information, which only can be referred to as relevant information in this case, that decision makers can make informed choices. Thus, the need by the decision maker to make a choice marks the instance when there is a creation of a need for information.

Grunig (1977) has identified two instances in which there arises the need to make a choice and therefore the need to acquire information. In one scenario, the theorist contends that there is a problem recognition in which "a person recognizes that something is lacking in a situation so that he stops to think about the situation (Grunig, 1977, p. 149). In the second scenario, the decision maker makes an effort to gather information when he or she sees himself as being implicated in the situation or problem (Grunig, 1977). When neither of these scenarios arise, efforts to attain information are limited.

In conclusion, it is suggested that when information needs are evident, however, the information must be of value and thus meaningful to the decision maker in the carrying out of his or her responsibilities.

The Gathering of Information Types

From a practical view, the pragmatics of the acquisition of information for decision making involves certain costs (Simon, 1955 and

March & Simon, 1958). Information is not free. It costs an amount of dollars to collect and organize information in an organization. Wherever costs are involved, the expenditure has to be justified somehow (March, 1988). The justification is more or less a simple process if a clear link can be shown between the information gathered and the anticipated decisions or problems. However, as the literature on decision theory makes clear, the role of information in the decision making process can be ambiguous and decision makers must work to optimize the use of information.

March (1988) is a strong advocate of the argument that there exists ambiguities between information gathering and decision making. Specifically, the theorist contends that the primary problem of the information gathered in organizations is one of relevance. Problems or actions are not understood enough so that they can be linked to the kind of information that can be of consequence (March, 1988). Instead, March contends that the pattern in most organizations include the formation of "information strategies that are relatively independent of specific anticipated demands" (1988, p. 390). March suggests as other theorists (March & Simon, 1958; Simon, 1955), that decision makers collect data as a part of a custom or as a routine in the work place with little regard for its relevance to the problems at hand. The act of data collection essentially becomes part of the rationalizing process of the decision maker (Simon, 1955).

In an effort to reduce this ambiguity between information collected and the concerns and problems of the organization, March and Sevon (1988) have posited the incorporation of a strategy to optimize the information.

By this, the theorists suggest that decision makers strive to achieve "a tight linkage" between flows of specific information and the making of specific decisions (March & Sevón, 1988, p. 434).

Byrnes and Chesterton (1973) have suggested that a way to collect relevant information is to establish a system of data collection. A clearly directed system will correlate the activities of deliberation over issues, opportunities and problems, with information that is relevant to the issues, opportunities and problems facing the organization (Byrnes and Chesterton, 1973). For a top level decision maker who deals with issues and problems of a highly complex nature, a system is an effective method to keep abreast of facts to make informed decisions (Byrnes & Chesterton, 1973).

Traditional Information Sources

The review of the literature on information gathering indicates that there are several types of information sources that have been available to the decision maker in complex organizations. All of these sources, however, are single-methods and thus do not denote systems, as described by Byrnes & Chesterton (1978) and March & Sevón (1988). Thus, when the sources are used in and of themselves, the information retrieved may or may not be optimized because the sources are not used in a strategy or system to link specific information with specific decisions.

In a study of the information sources used by top executives in multinational companies, Keegan (1974) categorizes the vast number of sources used by decision makers into two types - those sources that come from inside the organization and those that come from the outside. These

two types of sources include human, documentary and physical phenomenon.

With these categories, Keegan has provided a way of grouping several sources to make the study of sources easier. For instance, sources inside the organization of the human type are listed as: international division executives based abroad; headquarters international executives; corporate executives and staff; and, product division executives (Keegan, 1977, p. 414). Also listed as sources inside are documentary types which include information storage (including material that is stored either mechanically such as is the case of filing system or electronically as in a computer information system); reports; and, letters (Keegan, 1977, p. 414).

The same types of information sources - human and documentary - exist outside the organization but they are grouped differently. Under the human type, there exist service - organizations staff (that includes professionals such as lawyers and accountants that provide services to the organization); "competitors, distributors, consumers, suppliers, government officials and staff and other human sources" (Keegan, 1977, p. 414). Under the documentary type, the information sources listed include "publications, information service reports, and reports from external sources" (Keegan, 1979, p. 414).

Added to the list of the types of information sources outside the organization, is the type referred to as physical phenomenon this type of information represents information about objectives, events, and circumstances.

Although Keegan's classification encompasses most of the information sources cited in other studies it nevertheless omits other sources used by decision makers in organizations. With the use of the Keegan classification system, these sources of information are listed as follows:

Figure 1

Locations and TypeCategories

Inside the Organizations

Human

Technical staff

(Gertsburger & Allen, 1968)

Experimentation

(Gertsburger & Allen, 1968)

Training programs

(O'Reilly, 1982)

Previously acquired and
stored in memory

(Connolly, 1977)

Documentary

Previously acquired and stored
in notes

(Connolly, 1977)

Outside the organization

Human

Conferences, seminars

Documentary

Library

(Connolly, 1977; Rosenberg, 1966)

Scanning as a New Information Source

As an element in the decision making process, scanning is said to reduce uncertainty and risk (Nanus, 1979, p. 39) because it provides to the decision makers, information that is relevant to the problems to solve and issues with which they have to contend. When operating on a continuous basis, the scanning unit acts as a central depot in the organization where information about the environment is stored (Conference Board, 1979, p. 39).

The mandate of the system is determined by key decision makers in the organization such as senior executives or administrators. Based on their own work mandates, they identify the type of information they need to know in order to make informed decisions. Thus, the mandate of the scanning unit depends on the information needs of decision makers in the organization who need to run the organizations so it effectively meets its objectives. However, no matter whether the organization requires indepth information or broad information, organizations tend to retrieve information in any one or a combination of the following environments: economic, political, social, and technological (Diffenbach, 1983). Thus, to varying degrees, scanning systems monitor developments in the economy and in the political system on the local, national, or international level depending upon the nature of the organization's operations and therefore, its information needs (Conference Board, 1979). Also a scanning system monitors developments in society and in technological advancements, again depending upon the nature of the organization (Conference Board, 1979). So, essentially, a scanning system provides the information regarding these areas and this is the information that decision makers and planners need to know to work effectively (Ansoff,

1984; Cutlip, Center, & Broom, 1985; Diffenbach, 1983; Kalff, 1980; & Shipper & White, 1983).

From a practical view, the information is provided to the decision maker in one of two ways. Either the decision maker receives a written document in the form of abstracts or scanning updates to inform him or her of developments in the environments he or she is briefed during regular meetings of other key decision makers and members of the scanning unit. In some cases, both types of information distribution are used.

Several methods are used to retrieve information about these different environments though there is "no predominant pattern" on how a scanning unit operates (Conference Board, 1979, p. 39). However, for the most part, the methods used to retrieve information are categorized as being formal or informal methods. The methods used include scanning the literature, and using contacts outside the organization (e.g., government, private industry, and trade and professional associations), special interest groups, academics and specialists inside the organization (Conference Board, 1979, pp. 40 - 43). Subsequently, the information gathered from these methods is reviewed and analyzed in an effort to forecast issues and trends. The analysis is either overtly subjective or objective. These techniques are presented by Stoffels (1982) (Information in parentheses are editorial additions):

Forecasting Methods & Techniques

Subjective Methods (Informal methods)

1. Intuition
2. Extrapolation
3. Interview

Objective Methods (Formal methods)

1. Relationship Analysis

a. Descriptive

Cross-Impact analysis

Morphological models

Relevance Trees

b. Quantitative

Time-series

Cross-section analysis

2. Model Building

Industry, product models

Consumer behavior,
market models

Corporate models

System dynamics simulation

3. Process Application

Scenario development

Delphi analysis

The informal methods are what analysts use to interpret the data collected by scanning units so that they can identify future trends and issues. This interpretation, as indicated by Stoffels (1982), results from the use of intuition, extrapolation, and interviews. These methods are subjective because the interpretations of the data are influenced by the biases, perceptions, experiences and intelligence of the researchers. For example, when a researcher uses his and or her intuition to interpret environmental intelligence, he or she is making use of the non-rational

elements of human nature such as instinct and "gut reactions" to determine the trends and issues of the future. Far from being objective, instinct and gut reaction certainly depend on the individual's psychi and not some universal standard.

In the case of extrapolation, the method is used to study past events, issue, and trends in the environment to determine a pattern which would enable him or her to forecast future developments (Ansoff, 1984). The pattern that emerges results from his or her interpretation of the information presented to him. Thus, the method is subjective because it is based on one man's opinion of the formation of a pattern. His opinion is not based on a universal standard, but on his biases, intelligence, experiences, and perceptions.

The method of interviewing is as subjective as the methods of intuition and extrapolation. This method involves interviewing different experts to collect information about the environment so that the researcher can interpret the comments and observations of the respondents to forecast developments in the environments. The interpretation of the data , however, is not based on any universal criteria. Indeed, the same information gathered from the interviews can be interpreted differently by different researchers because as in the cases of the other informal methods, the interpretations of the researchers will have been influenced by his or her opinions, perceptions, and biases.

Unlike the interview method and other informal methods such as intuition and extrapolation, the formal methods are designed to be objective, according to the notions of objectivity that are posited in the empirical school. For instance, Stoffels (1982) groups into three categories which he referred to as Relationship Analysis, Model Building,

and Process Application.

The five tools that fall under the category of Relationship Analysis, for instance, enables the researcher to estimate the possible "consequences of trends and events" to the organization's operations (Ansoff, 1984, p. 326). Each tool, however, approaches the analysis from one of two perspectives (Ansoff, 1984). Some tools, including the cross-impact analysis, time-series, and cross-section analysis assess the consequences for the organization of several events occurring at the same time. Other tools, such as the morphological models and relevance trees assess the impact of one event at one time.

The models that fall into this category of Model Building are also designed to be objective as defined in the empirical sense. This method involves the development of models to predict future trends and issues in various environments. Unlike extrapolation, model building "predicts probable futures" by dealing with events presently occurring in the environment, not by dealing with events that happened in the past: Researchers construct a "model of reality" of the future "by changing inputs and relationships among the variables within the model" (Ansoff, 1984, p. 326). Thus, model building eventually identifies the impact of several events occurring at the same time, as in the cases of some of the tools of relationship analysis.

Tools referred to as scenario development and the delphi analysis are also designed to let the researcher measure the impact of events occurring simultaneously.

The literature on scanning indicates that the techniques or activities discussed above are being used more in organizations because environmental surveillance is becoming more prevalent (Shipper & White,

1983). This interest in scanning has been attributed to an overall increase in concern that decision makers have towards their environments. For example, Nanus (1982) contends that chief executives are devoting an increasing amount of time to environmental concerns. Furthermore, the activity of issues management (an activity which also requires the study of developments in the environment) is becoming more prevalent in the activities among senior management, public affairs specialists, and corporate planners (Conference Board, 1979, p. 1). Sears, Roebuck and Co., for instance, has incorporated a scanning unit into its organization and provides a good example of how the scanning system works in an organization.

The Sears scanning unit follows the continuous model and monitors eight aspects of the environment which decision makers have identified as being relevant areas to monitor in order to get information to make effective decisions (Conference Board, 1979). The comprehensive program monitors the following environments: social demographics, values/lifestyles shifts, resources, technology, public attitudes, government, international political and economic developments, and economic developments.

The scanning unit, as the system is referred to at Sears, is composed of two full-time members (Conference Board, 1979). The staff use publications and research reports as its primary source of information to identify trends and issues in the environments listed above. As part of this primary source of information, the unit scans some 100 publications such as trade magazines, business journals, and any other publications that will provide information about the environments the company is monitoring (Conference Board, 1979). However, in addition to this source,

staff members also interview researchers, specialists, academics and the company's own specialists to try to supplement the information they get from the publications, with the opinions and observations of the experts (Conference Board, 1979). In the end, the information is taken to a senior management committee composed of senior executives at the Sears headquarters. The committee, after reviewing the predicted trends and issues, determines whether the scanning unit has fulfilled their information needs. If new priorities regarding the type of information is considered necessary, feedback is sent to the staff of the scanning unit who are then expected to set a new agenda according to the information needs of the executives.

The literature indicates that scanning systems, such as the one being implemented at Sears, will continue to become more prevalent in organizations of all types. The central assumption behind this contention is that decision makers only become effective in the corporate setting after they have had the opportunity to analyze information that is relevant to the issues with which they deal (Bartha, 1982).

In practice, a scanning system in an organization is directed by decision makers to supply information that they need to make decisions that will help to realize the goals and objectives of organizations. Thus, the focus of any scanning unit always is to provide information of a utility worth in the decision making and strategic planning processes. As the processes of decision making and strategic planning continue to be important constructs in organizational communication research, and as more scanning units appear in corporate America, scanning will become an important topic in related literature.

THE FUNCTIONS OF SCANNING IN THE DECISION-MAKING PROCESS

As discussed in this paper, scanning is the common term used to refer to a comprehensive and systematic method used by organizations to surveil their environments (Conference Board, 1979). As a method that gathers information about developments in various environments, scanning involves a continuous monitoring process. Usually (though there are exceptions) this environmental surveillance involves an analysis of the environmental intelligence (Ansoff, 1984). The aim of the analysis, which is conducted with the use of different techniques (these techniques will be discussed in the following section), is to predict future issues and trends that will be of some consequence to the organization. Subsequently, these "forecasts" (Ansoff, 1984; Conference, Board, 1979; Fahey, King, & Narayanan, 1984; Nanus, 1983; & Stoffels, 1982), are used by decision makers in the development of the organization's policies, goals and objectives. The premise of using the forecasts in planning the organization's future is that the plans will be in line with the future environment and thus facilitate the organization's adaptation to a new environment (the importance of an organization's adaptation to the environment is discussed in greater detail in a subsequent section of the proposal).

The information collected by a scanning unit, therefore, must have a utility value in the decision-making process. Generally, the scanning unit collects information that is broad enough to be useful in the decision making and planning of the overall goals and objectives of the organization to facilitate the adaptation of the organization to the environment (Engledow & Lenz, 1985). Thus, the information is geared to help those in

the organization with the power to influence the policy, goals and objectives of the organization. According to Engledow and Lenz (1985, p. 94), scanning focuses "on early detection of broad strategic issues in the macro environment (shifts in attitudes, norms, laws, social roles) which are likely to result in public policy and have an impact on the corporation as a whole."

In fact, the broad scope of environmental intelligence collected by a scanning unit implies the fact that a scanning unit is a management tool. Indeed, the information collected is generally too broad to be of relevance to the decision making and planning processes of non-management employees in carrying out their functions in the organization; the tasks of the non-management staff are more specialized and the scope of their work is more narrow. Therefore, the information needs of these individuals would be of a specialized and technical nature. Generally, such information is not provided by a scanning unit (Conference Board, 1979; Engledow & Lenz, 1985).

As a method that is oriented to meet the needs of management, scanning has a definite function in the decision making and planning for the future of the organization so that the operations and goals of the organization can be adapted to the futuristic environments. Specifically, scanning functions as a source of information that has been collected systematically and under the guidelines developed by the key decision makers in the organization. Thus, this information becomes particularly crucial, as all information can be to the decision making process (Argyis, 1976; Conrad, 1985; March and Simon, 1958; Thayer, 1967; and Welck, 1969). The crucial element here, however, is the fact that the information provided by the unit is relevant and germane to the problems and issues of

the key decision makers in the organization. Thus, theoretically, scanning is a system of gathering information that unlike traditional approaches to information gathering, can provide a tight linkage between the problem or situation in the organization and the measures taken to get information to help solve a problem or reach a conclusion. In short, scanning answers the call for "a tight linkage" between flows of specific information and the making of specific decisions (March and Sevón, p. 434) through clearly directed systems of data collection (Byrnes and Chesterton, 1973). Clearly, traditional single methods of written vs oral research cannot be called clearly directed systems on their own.

CONCLUSIONS

As discussed in the previous section, scanning, as a source of information, plays an important role in decision making process. In fact, as an area of research in organizational communication, the study of scanning will advance knowledge of the role of information as it effects decision-making. However, this is not the only rationale to the study of scanning. As a source of information, the study of scanning has a practical consequence because a greater understanding of the systems can be used to improve the operations of existing systems. This is an important consideration because the use and collection of information have become critical aspects in the operations of organizations in contemporary society.

According to several writers, contemporary organizations require more information to operate effectively than ever recorded in the history

of the modern world (Ansoff, 1984; Conference Board, 1979; Cutlip, Center & Broom, 1985; Diffenbach, 1983; Kalff, 1980; Shipper & White, 1983; and Toffler, 1980). Goldhaber, et. al. (1984), for instance, claims that the management of organizations today is information-based, rather than being "coercion-based" or "tradition-based" (p. 278 - 279), an orientation that was prominent some 50 years ago when the management of organizations involved the coercion of people and other organizations to meet goals and objectives. In the traditional orientation that still is used today in some organizations, there is no consideration for the external factors such as public attitudes and needs that can affect the operations of the organization either indirectly or directly. Today, theorists contend that organizations are reality-bound in that they recognize the influence of external factors and therefore see a need to keep aware of the environments and operate from an "information-based" orientation (Goldhaber, 1984, p. 279).

Other theorists would agree that there has been a shift towards a recognition of a need for information and they have put forth several reasons to explain the new orientation. For instance, Ansoff (1984), purports the shift in the orientations has been due to the new environment in which organizations must work. He writes of an environment in which changes occur more rapidly than they did before. Today, purports Ansoff (1984, p. 8), in the post-industrial era (to use Bell's term (1973)), people focus on:

"social justice, poverty, housing, education, public transportation, environmental pollution, ecological imbalance: The private sector is now called upon to perform a two-fold role: (a) to restore and remove its problem-causing

activities (such as pollutants) and (b) to take responsibility for positive social progression."

These changing expectations are best considered as being part of the decision process because there now exists methods of forcing organizations to adapt to environmental variations if the organization does not do so voluntarily. Ansoff (1984, p. 2) says that unlike the time of the mass-production era (otherwise known as the industrial era), there exists such power groups as consumer protectionist groups, affluent consumer purchasers, and increased government intervention in economic and private sector activities.

The new contemporary society, with these aforementioned influences, makes it unwise for an organization to operate as a closed system as it did in the late 1800s (Ansoff, 1984). Organizations no longer have the luxury of not being distracted from "the business of business" (Ansoff, 1984, p. 6). An organization operating without interacting with the environment risks affecting a gap between its operations and the expectations made by the environment (Ansoff, 1984). Indeed, some writers such as Cadwaller (1959) suggest that in order for organizations to adapt to changing environments, an organization needs to interact with the environment to avoid increasing the gap between environmental expectations and the behavior of the organization. Thus, Cadwaller suggests that organizations must be open systems so that they interact with environments to adjust and adapt to changes in the environment (Cutlip, Center & Broom, 1986). Subsequently, this interaction can facilitate the organization's adjustment to changes in the environment because it provides information and insight that the organization needs to plan for the future. Thus, to ensure the organization's interaction,

Cadwaller calls for an open system in which there is a continuous flow of information between the organization and the system (environments) in which it exists. Cadwaller writes,

Any social organization that is to change through learning and innovation, that is, to be ultrastable, must contain certain very specific feedback mechanisms, a certain variety of information, and certain kinds of input, channel, storage, and decision making facilities. . . every open system behaving purposefully does so by virtues of a flow of factual and operational information through receptors, channels, selectors, feedback loops, and effects.

Other writers such as Shipper and White (1983) also contend that information flow between the organization and its environments is crucial to the process of the organization's adaption to the environment. However, the writers contend that adaptation in itself is important because when the organization does not adapt to changes, the changes will threaten the efficiency of the organization in that they will become obstacles to the realization of the organizations goals and objectives. Rather than work within a system with all the rules, values, and expectations, the organization with operations and goals that conflict with the nature of the greater system would be an entity operating unharmoniously within the greater system. Thus, information that helps the organization adapt to environmental changes is a crucial process in the organization.

In fact, the literature as discussed earlier, indicates that information is an invaluable component in contemporary society. As such, the study of a system that provides information is relevant to the needs of

an organization in this information-based age.

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